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# (12) United States Patent

Brooks et al.

# (54) TRAILER LIGHTING OUTAGE DETECTION CIRCUIT

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### (58) Field of Classification Search

CPC ..... G08B 21/185; B60Q 11/005; G01R 31/44 See application file for complete search history.

#### (56) References Cited

#### U.S. PATENT DOCUMENTS

#### FOREIGN PATENT DOCUMENTS

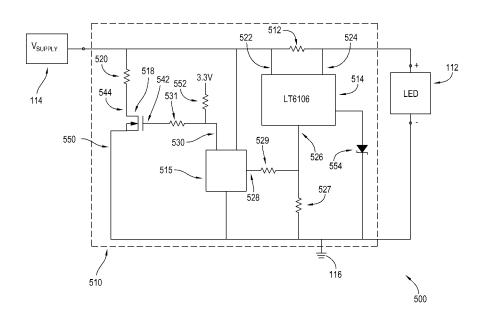
DE 3911896 A1 7/2002 DE 10215486 10/2003

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#### (57) ABSTRACT

A vehicle LED lighting outage detection circuit is disclosed for detecting a fault in the LED light and automatically increasing the power drawn from the light power supply in response to the fault. A complementary detection circuit is also disclosed for detecting the increased power draw and signaling a fault to an operator. The increased power draw can be selected to be in the form of a pulse that settles to a lower power draw state after a time to avoid excessive and wasteful power draw. The system can be mounted in a vehicle and, more particularly, to a semi-tractor truck, or installed as a retrofit system into an existing semi-trailer system.

### 11 Claims, 10 Drawing Sheets



<sup>\*</sup> cited by examiner